

Christov, C. I.

A complete orthonormal system of functions in $L^2(-\infty, \infty)$ space. (English) [Zbl 0562.33009](#)
SIAM J. Appl. Math. 42, 1337-1344 (1982).

Summary: A new complete orthonormal system of functions in the $L^2(-\infty, \infty)$ space is introduced. The system consists of two sequences composed of odd and even functions respectively. Unlike Hermite and Laguerre sets of functions which behave exponentially at infinity, the new system exhibits asymptotic behavior x^{-1} for the odd sequence and x^{-2} for the even one.

Formulae representing products, derivatives, etc. in series in the system are developed. A nonlinear differential equation with a requirement for summability of the square of its solutions, instead of boundary conditions, is solved. The example displays most of the features of the new method important for essentially nonlinear problems.

MSC:

33C45 Orthogonal polynomials and functions of hypergeometric type (Jacobi, Laguerre, Hermite, Askey scheme, etc.)

Cited in **3** Reviews
Cited in **67** Documents

Keywords:

Navier-Stokes equations; nonlinear boundary value problem; complete orthonormal system of functions in the $L^2(-\infty, \infty)$

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